

REMARKS/COMMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-9 are active in this case, Claims 1 and 8 having been amended by the present amendment and Claims 10-19 previously withdrawn from consideration as being directed to a non-elected invention.

In the outstanding Office Action, Claims 1, 2, 4, 7 and 9 were rejected under 35 U.S.C. § 102(e) as anticipated by Kuge (U.S. Patent 6,597,031). Claims 3 and 5 were rejected under 35 U.S.C. § 103 as being unpatentable over Kuge in view of Klersy et al (U.S. Patent 5,536,947). Claim 6 was rejected under 35 U.S.C. § 103 as being unpatentable over Kuge in view of Klersy et al and further in view of Ovshinsky et al (U.S. Patent 5,296,716). Claim 8 was rejected under 35 U.S.C. § 103 as being unpatentable over Kuge in view of Hush et al (U.S. Patent 6,731,528).

In response to the several grounds for rejection on the merits, Claim 1 has been amended to clarify the claimed invention and thereby more clearly patentably distinguish over the applied prior art.

To that end, amended Claim 1 recites a phase-change memory device including, *inter alia*:

... a memory cell array which has the memory cells arranged in a matrix, the phase change layer including first regions which contact the semiconductor substrate in units of memory cells and a second region which connects the first regions arranged in a same column;

a first electrode layer formed on the second region of each phase-change layer, a contact area of each first region and the semiconductor substrate being smaller than a contact area of the second region and the first electrode layer, the first regions and the second region are formed of a material which shows a phase change between an amorphous phase and a crystalline phase; ...

Thus, it is seen that in amended Claim 1, each of the first and second regions is part of a phase-change layer. Therefore, the first and second regions show an amorphous-crystalline phase change, i.e., the first and second regions are formed of the material which shows a phase change between an amorphous phase and a crystalline phase, as described in Applicant's specification at page 44, lines 17-19. For example, the first and second region may be formed of a chalcogenide compound.<sup>1</sup> It is respectfully submitted that amended Claim 1 patentably defines over the applied prior art, for the reasons as next discussed.

In particular, the outstanding Office Action states the finding that the layer 3 and the layer 41a in Figure 2 of Kuge respectively correspond to the recited first and second regions stated in Claim 1.

However, layer 3 of Kuge is a p-type well region and serves as a collector of a transistor as is evident from the disclosure at column 5, line 60. Layer 41a of Kuge is an n-type impurity region and serves as a base of a transistor (refer to column 5, lines 21-22). It is clear that neither layer 3 nor layer 41a of Kuge is a layer showing a phase change as recited in amended Claim 1. Therefore, amended Claim 1 states structure not disclosed by Kuge.

Further, even if the first and second regions of Claim 1 were to correspond to layer 3 and layer 41a in Fig. 2 of Kuge, respectively, Kuge does not disclose any equivalent for the structure of amended claim 1, wherein a contact area of each first region and a semiconductor substrate is smaller than that of the second region and a first electrode layer. In Fig. 2 of Kuge, a contact area of layer 3 and a semiconductor substrate (the area of substrate 1 excluding layers 3, 41a to 41c) is larger than that of layer 41a and layer 10a. That is, Kuge clearly fails to disclose the structure of amended claim 1. Therefore, amended claim 1 recites additional structure not disclosed by Kuge.

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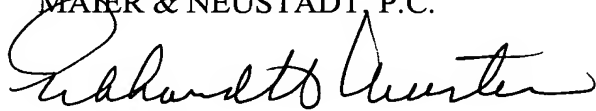
<sup>1</sup> See Applicant's specification, page 7, lines 7-10.

Accordingly, in view of the above differences noted between Applicant's invention as recited in amended Claim 1 and Kuge, it is respectfully submitted that amended Claim 1 patentably defines over Kuge. Furthermore, it is respectfully submitted that the deficiencies in Kuge are not remedied by the teachings of Klersy et al, Ovshinsky et al, or Hush et al recited in the rejection of the dependent claims. Therefore, it is respectfully submitted that amended Claim 1 patentably defines over the cited art, as to Claims 2-9 dependent therefrom.

Consequently, in view of the present amendment, and in light of the above discussion, it is respectfully submitted that Claims 1-9 are in condition for allowance, and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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